REMARKS

By the above amendment, applicants are amending the Title, Specification, and Claims to define an invention patentably over the prior art.

The Title change is to better describe the invention that is being claimed.

No drawing changes are proposed, thus allowing the drawings to stand as originally filed.

To correspond to the new claims presented, FIG. 8 is applicants' choice to appear on a title page if these new claims are allowed.

Claims

Cancel claims 37-56 and add new claims 57-87. Claims 57, 72, 77, 81, 82, and 86 are six independent claims, the same number of independent claims as in the originally filed application. The total number of pending claims is now 31 which is less than 36 as in the originally filed application. Arguments are presented later, following the next section on "Drawings", in support of the new claims.

Drawings

The withdrawal of requested changes to FIGS. 1A, 1B, and 3 is made in response to the Examiner's disapproval of those proposed changes. Applicants believe the changes might have been approved had they been accompanied with specific recitations of the support which exists within the original specification (including claims) and abstract. Here are some of those supporting excerpts, for the record, presented in the following three paragraphs "I", "II", and "III".

I. Support for multiple and different 2-port and 4-port side-polished devices between a common pair of substrates as proposed for FIG. 1A and 1B can be found in original claims 1, 5, 6, 7, 9, 15, and 32. Claim 1 includes "array of side-polished optical fibers held within

the common substrate form a mechanically integrated set of fiber optic apparatuses which may be of different types". Claim 5 includes "at least one of the optical fibers forms one of the group including an optical pass-through, an attenuator, a polarizer, a filter, a modulator, and a switch". Claim 6 includes "at least one of the optical fibers is part of one of the group including a coupler, an add-drop multiplexer, a tap, a splitter, a joiner, a filter, a modulator or a switch". Claim 7 includes "at least two substrates, wherein each said substrate has a first surface with a first array of grooves suitable for holding an array of side-polished fiber optics; and at least one array of side-polished fiber optics sandwiched within and between said grooves of two said substrates". Claim 9 includes "at least one of said 4-port apparatuses is one of the group including a coupler, add-drop multiplexer, tap, splitter, joiner, filter, modulator or switch". Claim 15 includes "multiple side-polished fiber optic apparatuses sandwiched between pairs of said substrate strips". Claim 32 includes "an array of 4-port side-polished fiber optic apparatuses".

II. Support for multiple and different 2-port and 4-port side-polished devices between a common pair of substrates as proposed for FIG. 1A and 1B can also be found in the abstract and in specification paragraph 61 (for example). The abstract includes "Examples of apparatuses that can be made with the disclosed integrated side-polished fiber optic technology include, but aren't limited to, couplers, multiplexers, taps, splitters, joiners, filters, modulators and switches. By interconnecting elements within compact integrated arrays of these apparatuses, complicated photonic circuits can be readily constructed." Paragraph 61 discloses: "FIG. 8 shows the manufacture 170 of a multi-channel optical add-drop multiplexer 171 (OADM). Many other apparatuses, such as a one-to-many power splitter, can be created using a similar structure. This add-drop multiplexer 171 is made from a first strip of half-couplers 172 and a second strip of half-couplers 173. The fiber 174 used in this second strip is a single fiber and runs in loops to pass once through each of the individual grooves of the substrate strip 175. Preferably, the loops formed by the fiber 174, together with the plane of the substrate 175, all lie close to a common plane for compactness. The detailed steps of fabrication can be taken from those described and illustrated with reference to FIG. 2 above. What is formed can be a many-to-one combiner or multiplexer or a one-to-many splitter or demultiplexer. If a demultiplexer is intended, one skilled in the art will know to include a grating within the fiber at the region of the

side-polish and/or between the two side-polished areas of the two fibers comprising the 4-port apparatus. With the addition of a film or slice of an electro-optically or thermally active material (for example a suitable polymer or crystal), sandwiched within the interface between the two side-polished areas of the fibers, switching arrays can be formed in a similar manner to the above".

III. Support for one or more extra (or additional) grooves which are oblique or perpendicular to the side-polished fibers, as proposed for FIG. 3, are for example found in claim 36 and paragraph 0041. Claim 36 includes "adding at least one groove in at least one of the substrate surfaces, whereby air or other gas can more easily enter between said surfaces". Paragraph 0041 includes "alternative means of delivering the UV light to cure the UV-curable material 50 is by way of an alternative path. Such a path to the bonding site between the two side-polished areas 41 and 51 can be provided (not illustrated here) with one or two pre-etched extra grooves in the surfaces 33 and/or 52 of the substrates 47 and 48, running obliquely or approximately perpendicular to the fibers 42 and 54. These extra grooves may be used as an open path for UV-light or to hold a short fiber or quartz fiber by which to deliver UV-light.".

Applicants respectfully request Examiner's reconsideration of those earlier proposed modifications to original FIGS. 1A, 1B, and 3. If the earlier proposed changes remain unacceptable, perhaps the Examiner would suggest to these pro-se applicants acceptable means of accomplishing a) showing a multiplicity of both two-port and 4-port side-polished devices on a pair of oppositely facing substrates, b) showing extra grooves between the oppositely facing substrate surfaces for allowing air of gas to come between these surfaces, and c) showing additional groove paths to regions of side-polish.

Arguments in Support of the New Claims:

Applicants have found a reference, US Patent Application Publication No. US 2001/0055443, published 12/27/01 and filed 2/27/01 by Shulai Zhao and Bo Pi, titled "Integration of fibers on substrates fabricated with grooves". This reference is in a separate IDS submission attached with this RCE submission. Zhao et. al. discloses and claims opening (holes) through a substrate by

which to interconnect regions of side-polish, whereas our own invention as claimed doesn't require nor claim opening.

In Amendment B, applicants presented arguments supporting the novelty and uniqueness of their own invention(s) over the prior art including the references which Examiner made to Tseng et al. (US 5,809,188) and to Tseng in view of Farries (US 5,778,119). Note that Tseng doesn't disclose or teach the interconnection of side-polished sites along a common fiber, and Ferries doesn't teach the use of side-polished structures nor the use of their substrates. Ferries doesn't acknowledge, let alone teach or suggest with a reasonable expectation of success, how one skilled in the art might accomplish interconnected side-polished-fiber sites all supported by a common substrate surface.

With this RCE, applicants present a new set of claims focused on the part of their apparatus invention that includes a segment of unbroken optical fiber to optically and seamlessly interconnect two regions of side-polish. Applicants invention claimed in these new claims a) does not resorting to the use of a connector or a fused splice, b) does not require alignment of the side-polished regions in a straight line along the fiber, and c) does not require the use of holes through the substrate. In contrast to our invention, Zhao et. al. accomplish interconnection between side-polished sites by weaving a fiber through holes in a supporting substrate and/or aligning side-polish sites in sequence along a generally straight path. Zhao et. al. does not disclose, teach, or suggest how to interconnect a pair of side-polish sites spaced along a fiber located along side one-another. In contrast to our invention, the rest of the prior art interconnects side-polished devices by using optical connectors and fused splices.

Applicants recognize the importance of reducing substrate real estate and therefore of having side-by-side parallelism of interconnected, side-polished, fiber-optic devices. We know this is motivated by the relatively long interaction lengths required of side-polished areas relative to the fiber diameter. Ferries's disclosure is totally disconnected of this motivation, and it would seem that of Zhao et. al. is also. Tseng's disclosures seem totally disconnected of any motivation to invent a way by which to interconnect side-polish devices, other than by evanescent coupling. Tseng's disclosures, and those of other's skilled in the art such as by Shaw, seem totally focused on the means by which to fabricate single 2-port and 4-port fiber-optic devices; they make no

mention of any interest toward interconnecting them without the use of standard connectors or without resorting to fused splices, the two techniques which are the standards of the prior art.

Due to a lack of invention prior to applicant's own work and disclosure, side-polished fibers traditionally have remained in their polishing substrates which are used thereafter as permanent support. It would appear that prior skilled workers and inventors in the art have been mentally blocked by the notion that fibers used through the polishing process should be kept short in order that their lengths outside the confines of the substrate should not become damaged in the handling and polishing steps used in their manufacture.

The new claims presented are all directed to apparatuses and multi-device assemblies which have at least one pair of substrate-bound, side-by-side, side-polished, fiber-optic devices seamlessly and optically interconnected by way of a shared fiber that is free of connectors or splices and generally unsupported between the pair. None of the holes required by Zhao are used. Also unlike Zhao, , seamlessly optically-interconnected regions of side-polished fiber can be placed side-by-side on a common substrate, rather than end-to-end, thus greatly reducing the maximum dimension required of the substrate.

Conclusion

For all of the above reasons, applicants submit that the accumulated amendment of the specification (by way of amendments "A", "B", and now "C") now put the specification into proper form, and that newly presented claims 57-87 particularly point out and distinctly claim at least one invention of applicants' disclosure that is novel and unobvious over the prior art. These claims are fully supported by the specification. Therefore applicants submit that this application is now in condition for allowance, which action they respectfully solicit.

Conditional Request For Constructive Assistance

Applicants are amending the specification and claims of this application so that they are proper, definite, and define novel structure that is also unobvious. If for any reason this application is not believed to be in full condition for allowance, these pro-se applicants respectfully request the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. § 2173.02 and § 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very Respectfully,

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